

Appl. No. : **10/809,566**
Filed : **March 25, 2004**

REMARKS

Claim 6 is amended herein to recite the language of previously-pending Claim 18. The amendment is supported by the specification, for example, at page 4, line 22 through page 5, line 7. No new matter is added by the amendment. Claim 18 canceled in view of the amendment to Claim 6.

Applicants thank the Examiner for review of the instant application. Upon entry of the amendment, Claims 6 and 8 are presented for examination.

Objection to Claims 6 and 8

Claims 6 and 8 are objected to for reciting informalities in claim language. Claims 6 and 8 are amended herein in accordance with the recommendations of the Office Action. Accordingly, Applicants respectfully request removal of the objection to the claims.

Rejection of Claim 6 under 35 U.S.C. §102(b)

Claim 6 is rejected under 35 U.S.C. §102(b), as being anticipated by Nishiyama *et al.* (U.S. Pub. No. 2002/0004288).

Claim 6 is amended herein to recite, *inter alia*, a step of deactivating the ground or polished surface of a semiconductor wafer by blowing ozone on the ground or polished surface of the semiconductor wafer. Nishiyama does not disclose a step of deactivating the ground or polished surface of a semiconductor wafer by blowing ozone on the ground or polished surface of the semiconductor wafer. Accordingly, Nishiyama does not disclose all elements of Claim 6. As such, Nishiyama cannot anticipate Claim 6 as amended.

Rejection of Claim 18 under 35 U.S.C. §103

Claim 18 is rejected under 35 U.S.C. §103, as being obvious over Nishiyama in view of Jiang *et al.* (U.S. Pat. No. 6,812,064).

Claim 18 is canceled herein. However, because Claim 6 is amended herein to incorporate the language of Claim 18, Applicants respond to the present rejection as it applies to amended Claim 6.

Claim 6, as amended, is directed to a method for manufacturing a semiconductor device, comprising steps of: providing a semiconductor wafer having a ground or polished surface

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activated in a grinding or polishing step, with semiconductor circuits formed thereon; deactivating the ground or polished surface by blowing ozone on the ground or polished surface of the semiconductor wafer; adhering a dicing sheet to the deactivated ground or polished surface of the semiconductor wafer after; and dicing the dicing sheet-adhered wafer.

The Office Action states that Nishiyama teaches grinding and polishing a wafer, then cleaning the wafer, then pasting a dicing sheet to the polished and cleaned wafer surface, and then dicing the wafer. The Office Action states that Nishiyama does not teach deactivating the ground or polished surface of a semiconductor wafer by blowing ozone on the ground or polished surface of the semiconductor wafer. The Office Action states that Jiang teaches blowing ozone on the ground or polished surface of a wafer, “preventing the ground or polished surface of the semiconductor from contamination caused by picking unwanted particles in production process step.” *Office Action* at page 5. The Office Action concludes that it would have been obvious to modify the method of Nishiyama according to Jiang “to provide a clean semiconductor wafer by preventing the semiconductor wafer from picking unwanted contaminant for a better manufacturing device process.” *Id.*

The Jiang Patent is entitled “Ozone treatment of a ground semiconductor die to improve adhesive bonding to a substrate.” Jiang teaches the use of ozone “to form a layer of silicon dioxide” on a semiconductor wafer. As suggested by the title of the patent, Jiang forms silicon oxide in order to improve bonding with an adhesive paste:

The present invention is based on the discovery that oxidation of the back surface of a semiconductor die to form a layer of silicon dioxide increases the strength of the bond formed between the back of the semiconductor die and the adhesive, and therefore, also the adhesive bond between the semiconductor die and the substrate to which it is attached. *Jiang* at column 3, lines 41-46.

Thus, Jiang teaches forming a silicon oxide layer to improve adhesive bonding to the substrate. Jiang states nothing about a silicon oxide layer “preventing the semiconductor wafer from picking up unwanted contaminant” as asserted in the Office Action. At most, Jiang teaches that the silicon oxide layer aids the automated process of momentarily attaching and releasing a semiconductor wafer by a pick-up tip of a wafer exchange machine. However, the principle teaching of Jiang is clear: “The silicon dioxide layer enhances the bonding of the semiconductor die to an adhesive.” *Jiang* at column 2, lines 59-61. Thus, Jiang teaches chemically modifying

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(*i.e.*, oxidizing) a semiconductor wafer surface in order to enhance the bonding of the semiconductor die to an adhesive.

Nishiyama teaches grinding and polishing a semiconductor wafer, and then cleaning the semiconductor wafer. Nishiyama does not teach or suggest that cleaning the wafer should be performed by chemically modifying (*i.e.*, oxidizing) the semiconductor wafer surface. Nishiyama provides no reason whatsoever for modifying the ground semiconductor wafer surface. If anything, Nishiyama's teaching of "cleaning" a semiconductor wafer should be viewed as removing unwanted matter, and not as chemically modifying the semiconductor wafer surface. Thus, in its plain meaning, Nishiyama's teaching of "cleaning" a semiconductor wafer would discourage one of ordinary skill in the art from chemically modifying the semiconductor wafer surface using the method of Jiang. Accordingly, Nishiyama's teachings would encourage one of ordinary skill in the art to avoid the method of Jiang when cleaning a ground semiconductor wafer surface.

In view of the above, Jiang provides no indication that such ozone blowing method would ever be used in a cleaning method. Moreover, one of ordinary skill in the art would avoid modifying the method of Nishiyama by adding a step of chemically modifying the semiconductor wafer. Accordingly, the teachings of Nishiyama would lead one of ordinary skill away from using the ozone treatment of Jiang. As such, these references cannot be combined to establish the method of Claim 6 as *prima facie* obvious. In view of the amendments to Claim 6 and the above remarks, Applicants respectfully submit that Claim 6 is not obvious over the cited references.

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CONCLUSION

In view of the above, Applicants respectfully maintain that claims are patentable and request that they be passed to issue. Applicants invite the Examiner to call the undersigned if any remaining issues may be resolved by telephone.


Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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Dated: November 20, 2006

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